Ohio Agricultural Experiment Station.

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# RECENT EXPERIMENTS WITH OATS.

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The experiments reported in the following pages have to do with comparative tests of different varieties of oats, together with a description of the same, relative to length of season, stiffness of straw, character of panicle and color of grain; the use of northern grown seed; the relation of rate of seeding to yield, and tests of a few varieties of barley, spring wheat and emmer.

The Station tests from 50 to 60 varieties of oats each season upon tenth-acre plots. They are grown in a four-course rotation of corn, oats, wheat and clover, with which is seeded a little timothy. Eight to ten tons of phosphated manure are applied to the clover sod during the winter, which is plowed in for corn. Three hundred and fifty to four hundred pounds per acre of a mixture of steamed bone, acid phosphate, nitrate of soda and muriate of potash are applied to the wheat crop, but no manure or fertilizer is applied directly to the oats.

A uniform check is inter-planted every third plot with the varieties of oats tested. The Wideawake oats have been used as check each year. The yields of the varieties tested are first corrected by the check plots, before being compared with each other.

In Table I is given the yield of grain and weight per bushel of 25 varieties, as grown each year for the past five years, and in the final columns the five-year average yield of grain, weight per bushel and pounds of straw per bushel of grain. The several varieties are arranged in the order of their rank as to yield per acre.

It will be understood, of course, that all yields of oats are computed at 32 pounds per bushel, regardless of their test weight per bushel. In view of this fact it will be noted that nature was prepared to break all records for us in 1908, providing the quality had not been affected by the unfavorable season.

Attention is called to the variation in yield and weight per bushel the different seasons, as shown by the yearly average of the 25 varieties. Seasonal conditions, including climatic, pathological and entomological factors, are mainly responsible for this variation. The four ranges of plots upon which these tests have been conducted are a very even body of land, and similar treatment for fifteen years has made the soil conditions still more uniform.

## TABLE I—Comparative test of varieties of Oats.

Yield per acre and weight per bushel.

| Name of variety. | 1904 | | 1905 | | 1906 | | 1907 | | 1908 | | 5-year average | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Yield Bus. | Weight per bu. Lbs. | Yield Bus. | Weight per bu. Lbs. | Yield Bus. | Weight per bu. Lbs | Yield Bus. | Weight per bu. Lbs. | Yield Bus. | Weight per bu. Lbs. | Yield Bus. | Weight per bu. Lbs. | Straw per bu. of grain Lbs. |
| Siberian | 93.66 | 32.00 | 65.09 | 27.75 | 78.88 | 28.75 | 49.06 | 26.50 | 65 63 | 24.50 | 70.46 | 27.90 | 38.5 |
| Sixty Day | 87.16 | ..... | 55.62 | 27.00 | 71.37 | 29.25 | 56.95 | 24.00 | 75.72 | 25.00 | 69.36 | 26.30 | 34.5 |
| Improved American | 85.66 | 30.75 | 59.45 | 24.50 | 87.21 | 25.50 | 45.47 | 27.50 | 67.18 | 24.50 | 68.99 | 26.55 | 44.0 |
| Illinois German | 76.35 | 31.75 | 67.19 | 27.75 | 79.61 | 26.25 | 47.55 | 30.25 | 74.14 | 23.50 | 68.97 | 27.90 | 42.7 |
| Joanette | 79.76 | 31.50 | 66.40 | 27.75 | 81.26 | 28.50 | 43.58 | 28.00 | 73.69 | 28.00 | 68.94 | 28.75 | 44.1 |
| Green Mountain | 82 54 | 30.50 | 58.96 | 26.00 | 88.12 | 25.25 | 45.03 | 27.50 | 68.86 | 22.50 | 68.70 | 26.35 | 43.6 |
| Big Four | 82.32 | 31 75 | 68 48 | 29.50 | 83.23 | 30.25 | 49.23 | 29.75 | 58.44 | 24.50 | 68.34 | 29.15 | 38.6 |
| Silver Mine | 84.07 | 33.00 | 64.50 | 31.50 | 82.55 | 30.50 | 47.14 | 32.25 | 60.12 | 22.00 | 67.68 | 29.85 | 39.9 |
| Czar of Russia | 71.69 | 31.75 | 63.72 | 30.00 | 81.62 | 28.50 | 45.69 | 30.25 | 71.03 | 24.25 | 66.75 | 28.95 | 42 5 |
| Morgan Feller | 75.47 | 31.50 | 62.18 | 28.00 | 80.63 | 26.50 | 45.24 | 30.25 | 69.35 | 23.25 | 66.57 | 27.90 | 43.6 |
| American Banner | 83 40 | 31.25 | 58.18 | 26.00 | 77.59 | 27.50 | 47.81 | 28.50 | 65.78 | 22.00 | 66 55 | 27.05 | 43.9 |
| Wilson's Prolific | 78.27 | 31.50 | 64.22 | 28.00 | 76.81 | 28.00 | 54.49 | 29.00 | 57.22 | 21.00 | 66.20 | 27.50 | 45.7 |
| Lincoln | 76.52 | 32.50 | 60.24 | 28.00 | 80.95 | 30.00 | 46.60 | 32.00 | 61.75 | 21.50 | 65.21 | 28.80 | 46.5 |
| Twentieth Century | 72.39 | 31.50 | 59.95 | 28.50 | 80.58 | 27.00 | 40.87 | 28.00 | 66.37 | 24.00 | 64.03 | 27.80 | 40.1 |
| Swedish Select | 81.89 | .... | 51.84 | 26.50 | 71.69 | 27.00 | 47.30 | 26.75 | 66.75 | 23.75 | 63.89 | 26.00 | 42.8 |
| Golden Fleece | 70.79 | 32.00 | 59.56 | 29.00 | 74.21 | 26.50 | 36.48 | 28.50 | 70.69 | 24.50 | 63.83 | 28.10 | 40.5 |
| Monarch | 74.80 | 31 75 | 62.37 | 28.75 | 73.60 | 31.25 | 44.78 | 30.75 | 59.41 | 23.25 | 62.99 | 29.15 | 43.2 |
| Seizure | 75.83 | 27.00 | 60.79 | 24.00 | 74.81 | 24.75 | 38.23 | 25.50 | 58.47 | 20.00 | 61.63 | 24.25 | 52.8 |
| Long's White Tartar | 73.66 | 31.25 | 44.33 | 26.50 | 86.97 | 31.25 | 50.63 | 33.50 | 51.09 | 23.50 | 61.34 | 29.20 | 45.7 |
| Alaska | 72.51 | 32.50 | 63.65 | 28.25 | 71.46 | 32.25 | 44.71 | 30.00 | 49.86 | 23.00 | 60.44 | 29.20 | 46.7 |
| Watson | 73.39 | 33.25 | 47.24 | 27.25 | 78.08 | 31.25 | 51.13 | 33.25 | 50.19 | 22.25 | 60.01 | 29.45 | 45.5 |
| Wideawake | 77.26 | 32.00 | 56.65 | 28.00 | 73.02 | 28.25 | 40.20 | 30.25 | 50.19 | 24.25 | 59.46 | 28.55 | 58.5 |
| Welcome | 73.76 | 32.00 | 55.25 | 26.50 | 72.24 | 26.75 | 48.70 | 29.50 | 47.21 | 22.00 | 59.43 | 27.35 | 50.9 |
| Clydesdale | 77.76 | 32.50 | 46.59 | 25.00 | 74.74 | 27.25 | 46.68 | 28.75 | 48.55 | 21.00 | 58.86 | 26.90 | 52.3 |
| Early Champion | 62.80 | 31.50 | 56.58 | 29.50 | 67.55 | 32 50 | 42.73 | 28.75 | 62.87 | 21.00 | 58.66 | 28.65 | 42.7 |
| Yearly average | 77 75 | 31.61 | 59.16 | 27.58 | 77.9 | 28.47 | 45 25 | 29.17 | 62.02 | 22.26 | 64.69 | 27.82 | 44.4 |

## VARIETY TEST OF 1908.

There are necessarily some few changes each year in the varieties of oats grown, New varieties are being continually introduced and room must be made for them in the Station's test plots. Accordingly the poorer varieties are weeded out and their places taken by the newcomers. In 1908, some new importations were introduced from Svalof, Sweden, viz.: Beardless Propsteier, Black Mogul, Golden Rain, Hvitling, White Ligowa and White Propsteier, also the Regenerated Swedish Select, from the Gartons, of England.

In Table II is given a list of the varieties tested in 1908. These varieties are described with reference to length of season, stiffness of straw, character of panicle, color of grain, yield of grain per acre, weight per bushel and pounds of straw per bushel of grain.

TABLE II—Variety test of oats, 1908.

Description of varieties.

| Name of variety | Length of season Days | Stiffness of straw | Side or branching | Color of Grain | Yield of grain per acre Bus. | Weight per bu. Lbs. | Pounds of straw per bu of grain. |
|---|---|---|---|---|---|---|---|
| Alaska | 101 | 85 | Br. | White | 49.86 | 23.00 | 56.7 |
| American Banner | 105 | 90 | Br. | White | 65.78 | 22.00 | 50.3 |
| Beardless Propsteier | 109 | 94 | Br. | Yellow | 53.74 | 23.25 | 44.1 |
| Black Mogul | 111 | 96 | Br. | Black | 44.25 | 19.50 | 61.8 |
| *Big Four | 105 | 87 | Br. | White | 58.44 | 24.50 | 49.0 |
| Clydesdale | 104 | 89 | Br. | White | 48.55 | 21.00 | 68.4 |
| Czar of Russia | 106 | 85 | Br. | White | 71.03 | 24.25 | 50.9 |
| Danish | 107 | 84 | Br. | Yellow | 72.12 | 22.50 | 42.8 |
| Dun | 109 | 78 | Br. | Gray | 49.98 | 22.25 | 68.8 |
| Early Champion | 100 | 79 | Br. | White | 62 87 | 21.00 | 52.4 |
| Golden Fleece | 106 | 83 | Br. | White | 70 69 | 24.50 | 40.7 |
| Golden Rain | 107 | 96 | Br. | Yellow | 61 98 | 28.75 | 40.9 |
| Green Mountain | 106 | 87 | Br. | White | 68.86 | 22.50 | 48.7 |
| Hvitling | 108 | 96 | Br. | White | 63.55 | 26.00 | 35.4 |
| Illinois German | 106 | 85 | Br. | White | 74.14 | 23.50 | 44.6 |
| Improved American | 106 | 90 | Br. | White | 67.18 | 24.50 | 45.2 |
| Selection 6143 | 105 | 89 | Br. | White | 68 96 | 22.25 | 47.6 |
| Joanette | 106 | 89 | Br. | Black | 73.69 | 28 00 | 46.9 |
| Lincoln | 105 | 87 | Br. | White | 61.75 | 21.50 | 54.7 |
| Leng's White Tartar | 104 | 92 | Side | White | 51.09 | 23.50 | 61.7 |
| Minnesota No. 6 | 107 | 85 | Br. | White | 67 08 | 27.00 | 37.9 |
| Monarch | 101 | 82 | Br. | Black | 59 41 | 23.25 | 54.8 |
| Morgan Feller | 106 | 88 | Br. | White | 69.35 | 23.25 | 47.7 |
| Pride of Ohio | 106 | 90 | Br. | White | 69.31 | 23.50 | 47.8 |
| Garton's Regenerated Swedish Select | 105 | 65 | Br. | White | 62 37 | 25.50 | 37.9 |
| Garton's Regenerated Swedish Select (heavy seeding) | 105 | 55 | Br. | White | 53.15 | 25.75 | 43.5 |
| Seizure | 109 | 92 | Side | Yellow | 58.47 | 20.00 | 62.9 |
| Sensation | 105 | 86 | Br. | White | 68.00 | 24.50 | 42.0 |
| Siberian | 105 | 82 | Br. | Wh. & Yel | 65.63 | 24.50 | 40.7 |
| Selection 6203 | 104 | 82 | Br. | White | 71.36 | 26.50 | 36.6 |
| Silver Mine | 104 | 85 | Br. | White | 60.12 | 22.00 | 50.7 |
| Sixty Day | 95 | 85 | Br. | Yellow | 75.72 | 25.00 | 31.4 |
| *Sixty Dakota (N. Dakota) | 94 | 75 | Br. | Yellow | 69.04 | 25.00 | 34.3 |
| Sparrow-bill | 108 | 84 | Br. | White | 48 79 | 22.00 | 71.4 |
| Storm King | 104 | 92 | Side | White | 51.07 | 21.50 | 63.7 |
| Swedish Select | 105 | 82 | Br. | White | 66.75 | 23.75 | 42.5 |
| Twentieth Century | 105 | 82 | Br. | White | 66.37 | 24.00 | 44.5 |
| Watson | 104 | 92 | Side | White | 50.19 | 22.25 | 63.7 |
| Welcome | 104 | 87 | Br. | White | 47.21 | 22.00 | 62.1 |
| White Ligowa | 105 | 96 | Br. | White | 65.41 | 25.75 | 33.4 |
| White Propsteier | 109 | 96 | Br. | White | 54.10 | 23.25 | 51.6 |
| Wideawake | 105 | 78 | Br. | White | 50.19 | 24.25 | 67.7 |
| Wilson's Prolific | 104 | 88 | Br. | White | 57.22 | 21.00 | 60.2 |
| Winter Oats | ... | 85 | Br. | Gray | 66.56 | 32.50 | 46.6 |

*Seeded a few days later owing to delay in getting seed.

The rate of seeding was uniformly 10 pecks per acre, *by measure*, except in the case of the new Swedish importations, which were seeded 8 pecks, by measure, owing to a scarcity of seed, and the plot of Regenerated Swedish Select described as "heavy seeding", which, by request of the Messrs. Garton, was seeded at the rate of 20 pecks by measure, or over 28 pecks by weight.

Attention is called to the fact that this heavy seeding reduced the yield of the Regenerated Swedish Select oats 9.22 bushels per acre, and that the normal rate of seeding of this variety is 4.38 bushels per acre below the "unregenerated" Swedish Select. This, however, is but one year's test and future results may be quite different.

Some of the Svalof selections show up very well, all things considered; particularly the White Ligowa and the Hvitling, but further testing is necessary. The seed of these selections tested above 40 pounds per bushel and the Gartons Regenerated Swedish Select, 46 pounds, due probably to the climatic conditions under which they were grown, but one season's growth in Ohio puts them about on a level with normal Ohio oats so far as weight per bushel is concerned.

## NORTHERN GROWN SEED.

In 1904, this Station introduced two varieties of oats from Canada, viz.: the Siberian and the Joanette. The seed of these varieties weighed, when introduced, twelve pounds per bushel more than the average of our own varieties. They have been grown each season from 1904 to 1908, inclusive. Table III shows the effect of our Ohio environment upon them.

**TABLE III—Canadian oats in Ohio. Increase (+) or decrease (—) in yield per acre and increase or decrease in weight per bushel, each year, as compared with average of 25 varieties among which they have been continuously grown.**

| Variety | 1904 | | 1905 | | 1906 | | 1907 | | 1908 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Yield Bus. | Weight Lbs. | Yield Bus. | Weight Lbs. | Yield Bus. | Weight Lbs. | Yield Bus. | Weight Lbs. | Yield Bus. | Weight Lbs. |
| Siberian... | +15.91 | +0.39 | +5.93 | +0.17 | +0.93 | +0.28 | +3.81 | −2.67 | +3.61 | +2.24 |
| Joanette... | +2.01 | −0.11 | +7.24 | +0.17 | +3.31 | +0.03 | −1.67 | −1.17 | +11.67 | +5.74 |
| Average .. | +8 96 | +0.14 | +6 58 | +0.17 | +2.12 | +0 15 | +1.07 | −1 92 | +7.64 | +3.99 |

The Siberian oats yielded higher the first season than they have since yielded. The Joanette oats yielded highest the last year of the five. Averaging the two varieties as to yield, the fifth year stands 1.32 bushel below the first.

In weight per bushel, both varieties have a wider lead the fifth year than they had the first year.

As bearing further upon the question of northern grown seed, two varieties from Montana and one from North Dakota were grown beside Ohio grown seed of the same varieties in 1908. Upon the average the Ohio grown seed exceeded the other in yield by 1.35 bushel per acre.

As to the advisability of using seed oats from the north and north-west when for any reason the Ohio crop is short, there seems to be little chance for loss. The northern grown seed may be expected to give about as satisfactory results as similar native varieties and seems to do about as well the first year as thereafter.

## RATE OF SEEDING.

Table IV gives the results of a series of tests of different rates of seeding, ranging from 4 to 11 pecks, and extending over eleven years. Four different varieties have been used in this work, and sixteen distinct tests conducted. The seed used has been carefully recleaned in every instance. Taking up the different varieties used it will be observed that the Seizure variety gives its highest average yield from 11 pecks of seed per acre; the Wideawake variety from 9 pecks; the Improved American from 11 pecks and the Siberian from 9 pecks. Combining these sixteen tests in one general average, 11 pecks of seed per acre have given the highest yield, and though this lead is but slight, still it is enough higher to a little more than pay for the extra seed.

The weight of grain per measured bushel has increased with the rate of seeding up to 10 pecks per acre. The average weight per bushel from the three lower rates of seeding is 26.46 lbs.; from the three higher (omitting the 12 pecks, which was included in only six of the sixteen tests) 27.97 lbs.

The yield of straw per acre, with both the Seizure and Wideawake varieties, is greatest from 5 pecks of seed per acre, and least from 11 pecks. This, however, is reversed with the Improved American variety, the greatest yield of straw being from 11 pecks of seed and the least from 4 pecks. By consulting Table I it will be noted that the Wideawake and Seizure varieties have the most straw in proportion to grain of any of the varieties reported.

TABLE IV—The relation oi rate of seeding to the yield of grain and straw.

| Pecks of seed per acre | 4 | | 5 | | 6 | | 7 | | 8 | | 9 | | 10 | | 11 | | 12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | Grain per acre Bus. | Straw per acre Lbs. | Grain per acre Bus. | Straw per acre Lbs. | Grain per acre Bus. | Straw per acre Lbs. | Grain per acre Bus. | Straw per acre Lbs. | Grain per acre Bus. | Straw per acre Lbs. | Grain per acre Bus. | Straw per acre Lbs. | Grain per acre Bus. | Straw per acre Lbs. | Grain per acre Bus. | Straw per acre Lbs. | Grain per acre Bus. | Straw per acre Lbs. |
| **SEIZURE.** | | | | | | | | | | | | | | | | | | |
| 1898 | 26.09 | 2,030 | 32.49 | 2,170 | 36.32 | 2,352 | 38.27 | 2,425 | 41.32 | 2,418 | 45.22 | 2,527 | 44 29 | 2,252 | ..... | ..... | ..... | ..... |
| 1899 | 22.18 | 1,245 | 25.15 | 950 | 26.24 | 965 | 30.93 | 1,030 | 32.49 | 1,005 | 36.24 | 985 | 37.65 | 985 | 39.84 | 1,100 | ..... | ..... |
| 1900 | 54.45 | 3,312 | 57.73 | 3,252 | 56.24 | 2,970 | 48.98 | 2,432 | 51.56 | 2,500 | 53.75 | 2,705 | 52.34 | 2,475 | 52.60 | 2,442 | ..... | ..... |
| 1901 | 21.79 | 1,512 | 27.65 | 1,495 | 25.15 | 1,435 | 28 43 | 1,360 | 31.24 | 1,480 | 35.93 | 1,650 | 34.99 | 1,410 | 36.71 | 1,515 | ..... | ..... |
| 1902 | 50.46 | 2,830 | 55.13 | 3,127 | 56.56 | 3,035 | 57.34 | 3,030 | 64.53 | 2,940 | 65.31 | 2,785 | 63.43 | 2,765 | 63 67 | 2,637 | ..... | ..... |
| Average | **34.99** | **2 186** | **39.65** | **2 199** | **40.10** | **2 151** | **40.81** | **2 055** | **44.23** | **2 069** | **47.29** | **2 130** | **46.54** | **1 977** | **48.21** | **1 923** | ..... | ..... |
| **WIDEAWAKE** | | | | | | | | | | | | | | | | | | |
| 1898 | 36.87 | 2,220 | 40.70 | 2,102 | 37.18 | 1,800 | 42.96 | 2,095 | 39.53 | 1,875 | 37.18 | 1,905 | 38.28 | 1,950 | ..... | ..... | ..... | ..... |
| 1899 | 36.48 | 1,307 | 37.73 | 1,387 | 38.51 | 1,227 | 43.76 | 1,402 | 43.90 | 1,365 | 43.12 | 1,400 | 44.13 | 1,307 | 32.03 | 1,225 | ..... | ..... |
| 1900 | 47.73 | 2,367 | 48.95 | 2,277 | 49.84 | 2,040 | 48.89 | 2,110 | 50.47 | 1,960 | 53.28 | 2,180 | 52.88 | 2,207 | 51.17 | 2,082 | ..... | ..... |
| 1901 | 36.39 | 1,666 | 40.14 | 1,826 | 38.11 | 1,791 | 40.15 | 1,736 | 40.61 | 1,411 | 42.34 | 1,686 | 41.94 | 1,638 | 44 37 | 1,591 | ..... | ..... |
| 1902 | 54.13 | 2,557 | 60.62 | 2,465 | 60.85 | 2,622 | 59.29 | 2,417 | 59.60 | 2,477 | 60.78 | 2,295 | 60.23 | 2,362 | 60.15 | 2,440 | ..... | ..... |
| 1903 | 39.37 | 1,664 | 41.44 | 1,683 | 39.64 | 1,681 | 43.35 | 1,727 | 48.31 | 1,898 | 47.03 | 1,760 | 46.79 | 1,757 | 49.29 | 1,807 | 44.52 | 1,639 |
| 1905 | 46.88 | 2,450 | 50.16 | 2,555 | 52.34 | 2,705 | 51.80 | 2,732 | 51.41 | 2,725 | 50.16 | 2,515 | 49.53 | 2,725 | 48 98 | 2,442 | 44.61 | 2,562 |
| Average | **42.55** | **2 033** | **45.68** | **2 042** | **45.21** | **1 981** | **47.17** | **2 031** | **47.69** | **1 959** | **47.70** | **1 963** | **47.68** | **1 994** | **47.66** | **1 931** | ..... | ..... |
| **IMPROVED AMERICAN** | | | | | | | | | | | | | | | | | | |
| 1905 | 52.42 | 2,342 | 55.08 | 2,337 | 56.25 | 2,300 | 56.02 | 2,257 | 60.16 | 2,315 | 59.59 | 2,492 | 59.22 | 2,505 | 62.97 | 2,605 | 58.28 | 2,375 |
| 1907 | 38.59 | 1,595 | 41.56 | 1,760 | 42.19 | 1,650 | 44.30 | 1,902 | 44,22 | 1,765 | 46.17 | 1,842 | 46.88 | 1,770 | 47.03 | 1,765 | 47.89 | 1,897 |
| 1908 | 67.19 | 2,500 | 70.23 | 2,712 | 72.27 | 2,707 | 71 25 | 2,620 | 67.89 | 2,627. | 69.92 | 2,782 | 69,14 | 2,917 | 69.14 | 2,837 | 70.00 | 2,930 |
| Average | **52.73** | **2,146** | **55.62** | **2,269** | **56.90** | **2 219** | **57.19** | **2 259** | **57.42** | **2 236** | **58,56** | **2 372** | **58.41** | **2 397** | **59.71** | **2 402** | **58.72** | **2 401** |
| **SIBERIAN** | | | | | | | | | | | | | | | | | | |
| 1906 | 66.64 | 2 667 | 66.56 | 2 610 | 67.81 | 2 430 | 70.23 | 2 382 | 70.00 | 2 360 | 72.66 | 2,265 | 71.87 | 2 340 | 68.12 | 2 140 | 69.53 | 20.95 |
| Combined average | 43.60 | 2 141 | 46.77 | 2 169 | 47.22 | 2 107 | 48 .50 | 2 104 | 49.83 | 2 070 | 51.17 | 2,111 | 50.85 | 2,085 | 51.86 | 2 045 | .... | .... |
| **WEIGHT PER MEASURED BUSHEL—LBS.** | | | | | | | | | | | | | | | | | | |
| Combined average | **26.53** | .... | **26.61** | .... | **26.24** | .... | **26.86** | .... | **27.58** | .... | **27.78** | .... | **28.09** | .. | **28 05** | .... | . .. | .... |

## BARLEY AND OTHER SPRING GRAINS.

In Table V is given the yield of various small spring grains which have been tested from time to time in the hope of finding a substitute for oats or winter wheat. Owing to the wide variation in weight per bushel of the crops compared, all yields are given in pounds per acre. With the exception of emmer (commonly called speltz or spelt) none have been tested the full five years. It will be noted that under the Station conditions the five-year average yield of 25 varieties of oats exceeds the five year average yield of emmer by over 46 percent.

TABLE V—Barley and other spring crops.

Yield in pounds per acre and weight per bushel.

| Name of crop | 1904 | 1905 | 1906 | 1907 | 1908 | Average | |
|---|---|---|---|---|---|---|---|
| | Pounds per acre | Pounds per acre | Pounds per acre | Pounds per acre | Pounds per acre | Pounds per acre | Weight per bu. |
| Emmer | 1,645 | 910 | 1,275 | 1,450 | 1,782 | 1,412 | 29 68 |
| Ohio Beardless Barley | 1,242 | 877 | ..... | ..... | ..... | 1,059 | 38.00 |
| Champion Beardless Barley | ..... | ..... | 1,567 | ..... | * | 1,567 | 37.00 |
| Highland Chief Barley | 930 | ..... | ..... | ..... | ..... | 930 | 43 50 |
| Black Hulless Barley | 2,010 | 1,062 | 1,442 | ..... | ..... | 1,505 | 58.00 |
| Manshury Barley | 1,850 | 1,887 | 2,002 | ..... | ..... | 1,913 | 38 62 |
| Oderbrucker Barley | ..... | ..... | ..... | ..... | 2,115 | 2,115 | 40.75 |
| Primus Barley | ..... | ..... | ..... | ..... | 1,755 | 1,755 | 42.00 |
| Princess Barley | ..... | ..... | ..... | ..... | 1,675 | 1,675 | 39.50 |
| Wild Goose Spring Wheat | 840 | 940 | 700 | ..... | ..... | 827 | 42 37 |
| Durum Spring Wheat | ..... | ..... | 882 | ..... | 1,090† | 986 | 44 37 |
| Minn. No. 169 Spring Wheat | ..... | ..... | 520 | 460 | ..... | 490 | 39.00 |
| Mammoth Spring Rye | ..... | ..... | ..... | 1 005 | 1,435 | 1,220 | 50.50 |
| Siberian Oats | 2,997 | 2,083 | 2,524 | 1,570 | 2,100 | 2,255 | 27 90 |
| Sixty Day Oats | 2 789 | 1 780 | 2 284 | 1 822 | 2 423 | 2 220 | 26.30 |
| Average of twenty-five varieties of oats | **2 488** | **1 893** | **2 494** | **1 448** | **1 985** | **2 062** | **27 82** |

*Seed of this variety failed to grow.

†Kubanka variety.

In so far as the barleys are concerned, with the exception of the Oderbrucker and Manshury, there is little competition with oats. The beardless sorts we have thus far tested have proved decidedly inferior to oats. The Ohio Beardless was grown two seasons—1904 and 1905. Comparing these yields with the average of the afore-mentioned 25 varieties of oats for the same seasons, we find the oats over 106 percent in the lead. Comparing the Champion Beardless with oats in 1906, as above, the oats lead by over 59 percent. It had been planned to test the Champion Beardless barley in 1908, but the seed purchased proved worthless.

The bearded barley, Oderbrucker, would seem likely to be a close competitor of oats and will be tested further.

It is, perhaps, of moment to show the digestible nutrients in oats and barley.

TABLE VI*—Digestible nutrients in 100 pounds of—

| Crop. | Dry matter Lbs. | Protein Lbs. | Carbo-hydrates Lbs. | Fat Lbs. |
|---|---|---|---|---|
| Oats..... | 89.0 | 9.25 | 48.34 | 4.18 |
| Barley..... . .... | 89 1 | 8.69 | 64.83 | 1.60 |

*Farmers' Bulletin No. 22, U. S. D. A.

Of the spring wheats tested, not only has the yield been found unsatisfactory but the quality has been such as to make it unfit for anything save stock feed. Minnesota No. 169, which has yielded so poorly when seeded in the spring, as shown by the above table, has given a yield of 33 bushels when seeded in the fall with the winter varieties.

For the purpose of comparison, the yields of two of the best varieties of oats, as well as the average of 25 varieties, are included in Table V.

## WINTER OATS.

This Station is testing a strain of winter oats which volunteered to go through the winter of 1905-1906 with our variety wheat, being self-sown from the spring crop of oats. Enough seed was saved from this volunteer crop to seed a twentieth-acre plot in the fall of 1906. This plot yielded at the rate of 46.41 bushels per acre in 1907, the average of all spring varieties being 44.24 bushels. In weight per bushel it exceeded the spring varieties by 3.08 pounds per bushel. This winter strain was seeded again in the fall of 1907 and as harvested in 1908 yielded 66.56 bushels per acre, the average of all the spring varieties tested being 61.51 bushels. In weight per bushel it exceeded the spring varieties by 8.92 pounds. It ripens from 8 to 10 days earlier than the average of the spring varieties. It has probably not yet been seeded heavily enough for best results. Whether it will prove hardy and worthy of introduction is yet uncertain. Further testing is necessary before it can be recommended.

## NO OATS FOR SALE.

The Station has no seed oats for sale. Through its Department of Cooperative Experiments it will arrange for small plot experiments with such farmers as desire to test different varieties in cooperation with the Station.